

Use of Orthoplast® for Winter Sports

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Abstract: *Orthoplast® has been found to be successful in padding the joints of athletes who compete in such high-velocity, high-impact winter sports as bobsled, luge, and skeleton. Traditional padding with foam or felt was not as effective against contusions, lacerations, and ice burns. Orthoplast is preferable because of its rigid, non-yielding and lightweight qualities, as well as its ability to be formfitted, thus aerodynamic. Two different techniques of using Orthoplast have been proven effective by the authors in protecting joints and body parts through a necessary range of motion. Bobsled, luge, and skeleton athletes, like other athletes, require full range of motion for effective sports participation. Shingled, jointed padding has been effective in protecting upper extremity joints, while the one-piece technique is used best for the lower extremity and nonjointed areas. These techniques can be used for many other sports where freedom of movement and protection are equally important.*

Orthoplast® (Johnson & Johnson) is often used for bracing or splinting of joint injuries in Sports Medicine.^{1-8,11,13} We also have found it to be an effective protective padding for contusions, lacerations, and ice burns incurred by our winter sport

athletes. Several winter sports, for example, bobsled, luge, and skeleton, involve high velocities of 40 to 80 mph. Impact injuries from colliding with ice walls are common.

Traditional padding methods were not as successful with our high-impact winter sports. Pads made from foam or felt alone did not give the protection needed for the hard impacts, and it was difficult to maintain proper positioning with these types of pads.

Orthoplast has been used to create pads that can move with the joints and body parts through the necessary range of motion and still protect the area when in static positions. Its advantages are that it is lightweight, provides rigid protection, and is formfitted easily to the athlete. Lightweight materials are valuable for such sports as bobsled and luge because they follow strict weight guidelines. For example, a two-man bobsled team must weigh 859 pounds or less. That total weight includes the sled, athletes, and any padding. Rigid, non-yielding pads are important protection against the high-velocity collisions. Formfitting pads are essential for improved aerodynamics in any sport that is measured in hundredths of seconds. Other types of thermoplastics¹⁰ could be used to give similar protection; however, our experiences are based on the use of Orthoplast. These techniques can be used for other sports where freedom of movement and protection are equally important.

Many authors have discussed using Orthoplast as a postinjury protectant.^{1-8,11,13} McCarthy⁹ described the use of Orthoplast as a prophylactic or preventive padding. Peppard and O'Donnell¹⁰ reviewed the different types of thermoplastics available. Sims and Markey¹²

presented an alternative padding method for contusions (bubble packing), which we considered for winter sport activities. This we deemed unacceptable for bobsled, luge, and skeleton because of the raised, nonaerodynamic position of the padding. We could find only one unpublished paper (Del Negro and Rockwood, USOC 1987) in which a high-velocity and high-impact winter sport was studied. These authors examined the injury rates and types during a full luge season. This paper briefly discusses Orthoplast as a valuable protective padding.

Description of Sports

The sport of bobsled involves two- or four-man teams. The athletes push the sled approximately 50 meters before they jump in and slide down a mile-long iced track. The track consists of up to 18 various curves. Bobsledders are afforded some protection from the walls of the track by the sled itself. However, the athletes also need to be protected from the steel and fiberglass encasing of the bobsled. Common injuries include contusions of the shoulders and hips.

Luge involves one or two athletes sliding feet-first and supine on a small sled. The sled is steered with the legs and with shoulder motion. The start consists primarily of a ballistic double-arm pull from start handles, followed by three to five strong paddling motions with their spike-adorned hands on the iced track. The lateral shins and elbows of a luge athlete are particularly at risk for contusions and lacerations. These areas have an increased chance of contact with the walls and sleds because of positioning.

Skeleton athletes slide alone, prone and headfirst, steering with shoulder motions and dragging their feet. These athletes start by sprinting while crouched alongside their sled for approximately 30 meters before jumping onto the sled. Shoulders take the brunt of most impacts with the walls, and contusions are common.

Athletes involved in these sports encounter speeds of up to 80 mph. Although the goal is to avoid impact with the walls of the track, it is an inevitable experience for all athletes involved. We use Orthoplast for preventive

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Fig 1.—See text.

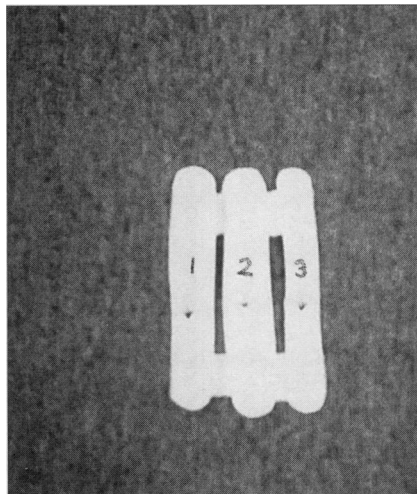


Fig 2.—See text.

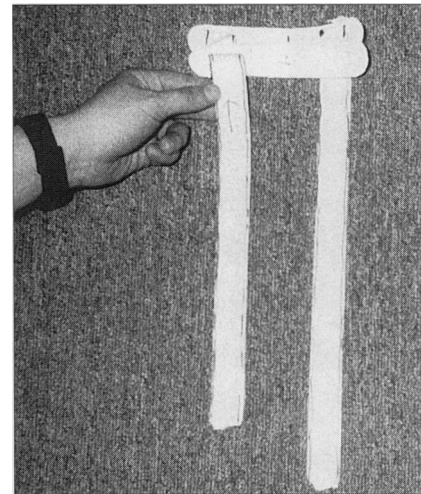


Fig 3.—See text.

protection, as well as for protecting injured areas. The majority of our athletes have preventive pads for the most common impact areas, ie, hips for the bobsledders and lateral shins for the lugers. The athletes are able to use these pads for more than one season. Because of the expense of thermoplastics, we strongly encourage our athletes not to lose the pads.

Techniques

There are two different styles of padding that we use on various body parts. Style one is a shingled padding that has proven effective for protecting upper extremity joints. Style two is a one-piece technique. We have been successful using this technique when padding lower extremity joints and such nonjoint areas as the thigh or forearm.

Style One: Shingled Padding

We will use the shoulder as an example joint to be padded:

1. Cut seven to eight strips of Orthoplast — 1"x6". The number of strips and dimensions will vary with the size of the shoulder. Round off the corners.
2. Heat the strips to the temperature suggested by the manufacturer until the Orthoplast is pliable. A hydrocollator, heat gun, or convection oven could be used.
3. Place four strips over the shoulder. Strips run anterior to posterior in a horizontal fashion with the strip that

is most superior overlapping the next by 1/8" to 1/4", and so on (Fig 1).

4. Place the remaining strips longitudinally along the upper arm about 1/4" apart. Superior edges of strips should extend under the last strip of overlapping shoulder cuff (Fig 1).
5. Wrap in place until the Orthoplast forms a semirigid shield.
6. While in place, number/label all strips as to position. Then place the strips in cold water to set the Orthoplast completely.
7. Using 1" white tape, tape upper arm strips together, leaving appropriate spacing between the strips to form a ribbed effect (Fig 2).
8. To tape the strips of the shoulder cuff, use two 12" strips of 1" white tape:

- Starting with the topmost strip of Orthoplast, place tape on the outside of this strip and tape around the Orthoplast strip, ending on the inside of the strip.

- Do not tear the tape, but double back, so that the adhesive side of the tape is up.

- Repeat this step on the other end of the Orthoplast strip with the second piece of tape.

- Take second strip of Orthoplast, place it halfway over the first strip onto the adhesive tape. The second piece will be attached to the tape adhesive (Fig 3).

- Wrap the pieces of tape around the second strip and again double back

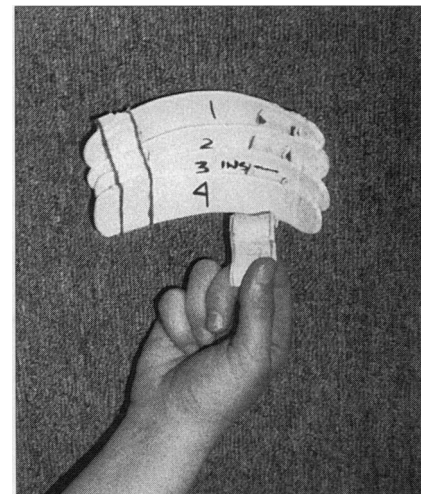


Fig 4.—See text.

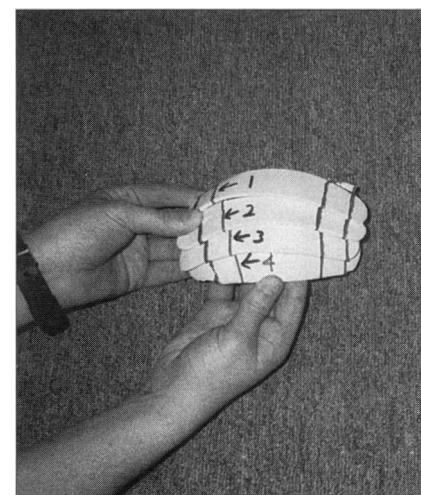


Fig 5.—See text.



Fig 6.—See text.

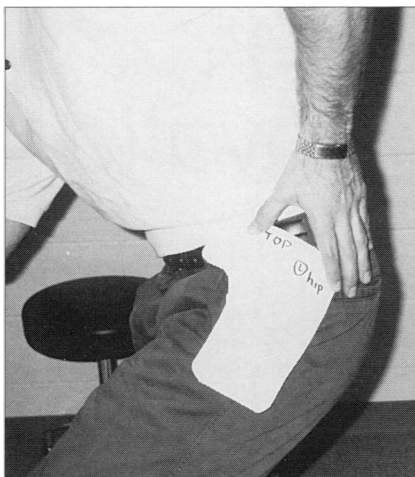


Fig 7.—See text.

on the inside.

-Place the third strip down and tape it in place. Continue until all four strips are secured together in a shingled fashion. Tape over any exposed adhesive (Figs 4 and 5).

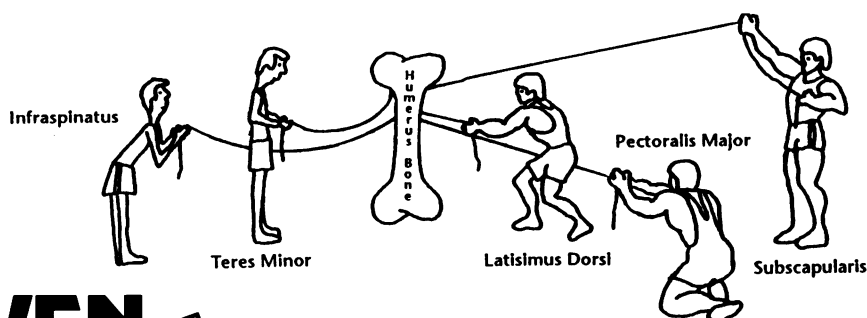
9. Place pads between skin and clothing (rubberized/latex racing suits) (Fig 6). If racing suits are not used, use an elastic bandage to secure the pads in place.

Style Two: One-Piece Padding

This is a more traditional approach to padding. In this example, the method of how we pad a hip is as follows:

DON'T GAMBLE

on the stability
of your
athletes' shoulders



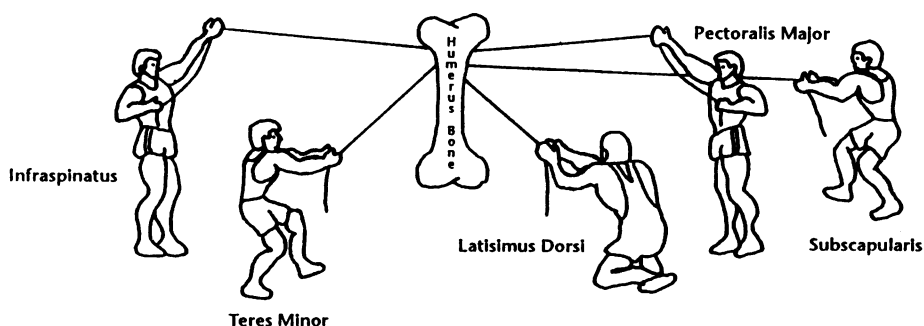
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1. Cut out an upside down "L" shape to match the athlete's hip. Leave the anterior space open to allow for hip flexion for sprinting. Round the corners at this time.
2. Heat the Orthoplast as suggested by the manufacturer until it is soft and pliable.
3. Mold the Orthoplast around the area. Have the athlete place his/her leg in hip flexion. Wrap or hold the pad in place until it becomes semirigid (Fig 7).
4. Place the pad in cold water to set completely.
5. Mark pad with name, side, and direction (ie, up or down).
6. Pad entire inside of pad with 1/4" adhesive foam. You can also rim the inside of the pad with foam if a doughnut effect is desired.

The preceding examples and combinations of these techniques have allowed us to deal with the uniqueness of these three winter sports. These tech-

niques also can be used in such other impact sports as field hockey, ice hockey, lacrosse, skiing, and soccer, where a rigid and lightweight protectant is helpful.

Protective padding over joints in motion is always a challenge for the athletic trainer working with athletes. The challenge arises because these athletes must be able to perform their sport unrestricted by any protective padding. Clinically, the techniques discussed here have been repeatedly successful for our immediate needs and are useful across a wide range of sports.

Acknowledgments

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